

PRINTER RUSH
(PTO ASSISTANCE)

Application : 09/839 932 Examiner : Hendrickson GAU : 1754

From: PAP Location: IDC FMF FDC Date: 3/28/06

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DOC CODE	DOC DATE	MISCELLANEOUS
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<input type="checkbox"/> CLM		<input type="checkbox"/> Document Legibility
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[RUSH] MESSAGE: Continuing data found on Palm/bib data sheet is missing from the Specification (Provisional Ser. No's.) Please advise.

Thank you

[XRUSH] RESPONSE:

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REV 10/04

now patent number 6,221,330 which claims benefit of U.S. provisional application 60/106917 file 11/3/1998, this application claims benefit to U.S. provisional application 60/114588 filed 12/31/1998 and claims benefit to U.S. provisional application 60/117587 filed 1/27/1999 which claims benefit to U.S. provisional application 60/161728 filed 10/27/1999

TITLE OF THE INVENTION

PROCESS FOR PRODUCING SINGLE WALL NANOTUBES USING UNSUPPORTED METAL CATALYSTS AND SINGLE WALL NANOTUBES PRODUCED ACCORDING TO THIS METHOD

This application is a divisional of Serial No. 08/910,495, filed August 4, 1997,

incorporated by reference herein in its entirety.

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to a method for producing single wall carbon nanotubes, also known as linear fullerenes, employing unsupported metal containing catalysts, for decomposition of a C₁ to C₆ carbon feedstock such as carbon monoxide.

Description of the Related Art

Multi-walled Carbon Nanotubes

Multi-walled carbon nanotubes, or fibrils, are well known. Typically, carbon fibrils have a core region comprising a series of graphitic layers of carbon.

Since the 1970's, carbon nanotubes and fibrils have been identified as materials of interest for a variety of applications. Submicron graphitic fibrils belong to a class of materials sometimes called vapor grown carbon fibers. Carbon fibrils are vermicular carbon deposits having diameters less than approximately 1.0 μ . They exist in a variety of forms and have been prepared through the catalytic decomposition of various carbon-containing gases at metal surfaces. Such vermicular carbon deposits have been observed almost since the advent of electron microscopy. A good early survey and reference is found in Baker and Harris, Chemistry and Physics of Carbon, Walker and Thrower ed., Vol. 14, 1978, p. 83, and in Rodriguez, N., J. Mater. Research, Vol. 8, p. 3233 (1993).